

expression of a frank opinion upon subjects submitted to their judgment.

I should observe, that the *Cavalière Matas* applied to the Royal Institute of France: they referred the matter to a commission, who have given a most judicious and argumentative report, to which are appended the names of Vaudoyer, Le Bas, Le Clerc, and of other distinguished men. May such an example prove infectious, and the Institute not adopt the opinion, that in such a case they best maintain their dignity by a timid reserve?—M. I. B. A.

"* Strong in the correctness of our remarks last week, we willingly give insertion to the above contrary view of the case, to have such weight as it may with the committee who were appointed: at the same time, we repeat the expression of our hope, that they will not be led into needlessly and uselessly "flattering the vanity or wounding the feelings" of the author of the design in question. The fact of the French Institute having already done so, would of itself lead us to oppose the course proposed, if there were no other grounds of objection; for we confidently ask, without wishing to underrate the design, whether it is of such a character as should entitle it to the deliberations of England and France, besides those of Italy? It is giving the design an importance beyond its due. There have been several proposals for the completion of this cathedral; there may be, and probably are, more designs for it before the authorities at this moment; and, as we said last week, an opinion given by the Institute might be brought to bear injuriously to superior merit. Let the Institute speak out as loudly as they please, where their speaking will do service, but not in a case like this, where no good can be done by it, and harm may.

We have received several letters (four) taking the same view as ourselves—but have room for the following only:—

Sir,—Your account of the proceedings of the Institute of British Architects, at their last meeting, is calculated to inspire considerable misgiving in all men who have attentively watched the tendency of chartered societies to outstep their original purpose, in order to gain a more influential but really less useful position. This observation refers entirely to the appointment of a committee to report on the *Cavalière Matas's* design for a west front to the Duomo, or rather of the Sta. Maria dei Fiori at Florence, in consequence of a special application to the Institute for its written opinion of that design. The reading of a paper for or against any work of art, provided it be in proper language and fit for a society of men of talent, is a legitimate occupation for the Institute; conferring prizes or premiums on successful competitors for their advertised designs or essays is equally so; but to sit like a grand jury, to decide on *ex-parte* statements on the merits of the whole profession all the world over, and issue certificates of merit, can never have been contemplated by those who granted the charter, nor, at the time, by those who sued for it. Assuredly, if they had put forth such an intention in their application to the Crown, it would have endangered its success, and very properly so; for in an age when the principle of equal rights and fair play is recognised, even grand juries, once the only mitigation of oppressive laws, are become a nuisance from the frequent damage done to the character of persons not in court to rebut imperfect statements. You have very properly remarked, that there may be other designs for the purpose, not before the members of the Institute, by men of talent, who would suffer from a one-sided opinion. It would not be the first competition for this very purpose of a façade to the Florentine cathedral; and if it is to be looked upon as a matter of great importance, so as to allow a dangerous departure from the ordinary mode of proceeding of the Institute, it is to be hoped that the appointed committee will require all the evidence that can be procured, such as the designs that have been on former occasions made for the purpose, and inquire whether any besides that of *Cavalière Matas's* divide the attention of Italy at this moment. It has been suggested that the designs of Palladio and of Vignola and Peruzzi are well deserving the notice of the architects of this country: let them be sought and compared with each other, and with the worthy knight's performance. Then, and not till then, the committee will be enabled to produce a report

worthy of themselves, of the profession, and of our country; then they will be competent to speak of its originality and merit, and do justice to all parties, as it is quite certain they wish to do; for I am fully persuaded that the very eagerness of those gentlemen for the appointment of the committee proceeded from that excellent motive, but prevented them, in the hurry and excitement, from seeing what may be the consequences of a rash enthusiastic proceeding.—I am, Sir, &c. AN AMATEUR.

APPLICATION OF GEOLOGICAL SCIENCE TO THE CHOICE OF BUILDING MATERIALS.

PROFESSOR ANSTED, in the course of his lectures at King's College, London, has treated largely of building materials, especially of Stone. He said,—The best way to obtain a true knowledge of the nature of the stone, was to look at it in the neighbourhood of the quarry; and, having thus obtained some idea of the action of the weather upon it, one might go into the churchyard, and study the condition of the tombstones, which, being erected in every imaginable direction, were liable to every phase of exposure, and would inevitably show how disintegration was most likely to be produced. A good idea of the value of stone for common use might thus be formed. For stone to be good for ordinary purposes, it must possess several qualifications. It must be of a tolerably even texture, for if it were very uneven it would be acted upon irregularly by the weather. It should possess a moderate degree of hardness, for if it were too hard, it could not be worked, except at great expense; or, if too soft, it would not bear the requisite amount of pressure. If it were very absorbent of water, it would be unfit for external work, as, in that case, the expansive action of frost would be very injurious. Many of the cathedral churches in England showed the results of this particular action of the weather, in cracks and crumbles, often in portions of the structures which rendered the condition of the whole very precarious. The professor described, at some length, the various evils resulting from absorption of water by the stone used in building, and concluded his remarks on that point by observing, that great care should be taken to put stones of a laminated or fissile character into the building, in the same way as that in which they existed in the quarry, unless, indeed, they exhibited there a great inclination to the horizon.

The effect of atmospheric action upon stones being a matter of great importance in forming an estimate of their positive and relative value, the possibility of devising some measure of their various qualities, in this respect, was evidently a question of importance. A Frenchman, named Brard, discovered, some time ago, a method which, although not infallible, afforded a pretty accurate indication of the effects of atmospheric action, and which had often been adopted for the trying and describing the qualities of different stones. This method (which the lecturer described at length) consisted of boiling cubes of stone, selected from different parts of the block to be tried, in a saturated solution of Glauber salts, for a certain time. The cubes were then to be suspended by a string, completely isolated from the touch of any thing else, over a vessel full of the solution in which they had been boiled, taking care that no fragments of stone detached in the boiling remained in it. Twenty-four hours afterwards, the cubes would be found covered with small crystals of salt, which were to be got rid of by plunging the cubes into the solution over which they were suspended; this to be done every time crystals of salt were thrown out. The experiment should last four days, and at the end of that time, the amount of disintegration, by the effects of frost and weather, would be indicated by the weight of the particles of stone found in the solution, which had been forced out by the salt.*

Besides the quality of disintegration, there were a number of others necessary to be studied, in order to arrive at a true estimate of the value of stones. The chemical composition of stones, and their power of cohesion, were also of the last importance, and must all be considered carefully.

* The value of this process has been questioned by Mr. C. H. Smith. See "Transactions of Institute of Architects."

Passing over the new red sandstone and lias, he came to the *oolitic rocks*, which were very extensive. They were generally arranged in three groups—the upper, consisting of limestone, with clay below; the middle, of another limestone, with clay below; and the lower, of a variable group, chiefly limestones, containing a few clays and a few sandstones. The most important of these beds were the lower part of the lower division, and the upper part of the upper division. That was the case in England and, to a certain extent, in France,—the *Cenomanian* being a continuation of that worked in the west of England, and, probably, of the same age and condition as the Bath stone.

Several useful limestones were obtained from the upper oolites; but, of all these, the *Portland stone* was most extensively known. There were different kinds of Portland stone, varying in value according to the manner in which the different beds were placed, a knowledge of which was very important to the English architect. The most valuable qualities of this stone were its hardness and weight—though both these were qualities which tended to make it expensive both in quarrying, in carriage, and in working. It was a tolerably pure carbonate of lime, of which there was in its composition 95 per cent., with 1 per cent. each of silica and carbonate of magnesia. This was a very good mixture, and the stone possessed an even grain, and was exceedingly durable. Its colour was generally a creamy white, and it was often the whitest of the oolites found in England. It was, therefore, a handsome stone when first worked; but it was liable to blacken very soon when exposed to the action of smoke. All stones, more or less, would blacken in London; but none more so, or sooner, than Portland stone, and it appeared to resist the pyroligneous acid in smoke rather less than others. The west front of St. Paul's Cathedral, which was built entirely of Portland stone, was a remarkable instance of this, being now, though only erected a moderate time, completely covered with soot. The Reform Club, the Goldsmiths' Hall, and many other buildings in London, were, nevertheless, built of this stone. Its cohesive power was not so great as might have been expected from its specific gravity, which was 2.145. It bore heavy weights, however, exceedingly well. In St. Paul's, for instance, though there was a vast accumulation of materials, there was no appearance whatever of the stone being crushed. It was, however, more remarkable for its hardness than for its cohesive power.

The next stone he described was one of a very different quality, and it was that quarried at Bath,—a material so soft and so easily worked, that its cost in London was considerably less than that of Portland stone. Bath stone was so soft in the quarry, that it could almost be cut like cheese; but it hardened to some degree afterwards by exposure. It was not so uniform in quality as Portland stone, there being three distinct kinds, which differed in several important points, and in value. The great faults of Bath stone were its softness, which no amount of exposure could overcome; the lowness of its cohesive power, which made it certain to be crushed with only a moderate weight; and its lightness. Its specific gravity differed very greatly indeed from that of Portland stone, being only 1.839. For these reasons it was more adapted for ornamental purposes; though there were some public buildings, and many private houses, built of it, probably on account of its cheapness. It was not at all good for such purposes, however, as might be seen by an inspection of Henry VII.'s Chapel, in Westminster Abbey, where this stone, of which that edifice was built, being exposed under circumstances in no degree unfavourable, was very much decomposed and decayed, and the freshness of its workmanship everywhere lost. Pieces of Portland stone, on the contrary, which were intended for St. Paul's Cathedral, though rejected and probably of inferior quality, bore the marks of the chisel as fresh as possible to this day. Many of the buildings at Oxford were of Bath or Heddington stone, and in that city it had peeled to such a degree as to give the various colleges the appearance of falling to ruin. The carbonate of lime, in its composition, did not differ much in quantity from Portland stone, being 94½ per cent. as compared with 95. It had, however, 2½ per cent.